designed to be as cost-effective as possible, and efforts have been made to provide the most attractive possible set of alternatives. Comparison of benefits to costs for each of the resulting alternatives leads to a ranking in order of desirability. In most cases, the ranking should be on the basis of the benefit/ cost ratio. Where alternatives differ significantly with respect to resulting level of protection, uncertainty associated with benefit and/or cost estimates, fraction of cost borne by private parties, or other factors, it may be desirable to utilize a multiobjective optimizing approach.

Limitations to Analysis

The promotion of ground water protection programs is generally based on the old adage that "an ounce of prevention is worth a pound of cure." However, it is not a simple matter to demonstrate quantitatively the advantages of ground water protection programs. It is true that cleanup efforts for contaminated ground water problems, the development of alternative supplies, and other remedial measures are generally very expensive and are usually only partially effective. However, good prevention programs are also expensive, and for programs now in place effectiveness has not been well demonstrated because of the short period of operation. There are insufficient data at this point to weigh the costs of prevention versus the costs of cleanup in a comprehensive, quantitative manner.

However, remedial action costs run in the billions of dollars as evidenced by Superfund expenditures alone. In addition, major efforts such as state superfund programs and Department of Defense activities for ground water cleanup cost hundreds of millions of dollars per year. On the other hand, the implementation and maintenance of effective ground water protection programs on a statewide basis will probably cost considerably less, on the order of $1 million to $100 million a year depending on the size of the state and the nature of its ground water resource problems. Florida, for instance, currently spends at least $50 million a year implementing its ground water protection program. In addition to statewide programs, there are many costly local programs such as those in southeast Florida and Long Island, New York.

The major difficulty in evaluating the economic value of ground water protection is determining all related costs and benefits. How, when, and to what extent should contaminated ground water be rectified? It may be easy to criticize the pesticide contamination problems such as those in California, Florida, and Long Island, and to suggest that it would have been more economical to have prevented the problem before it occurred; however, at the time of application, it was not widely known that these pesticides would become a problem. Even if the problem had been known, however, there